

REMARKS/ARGUMENTS

Reconsideration of this application and entry of this Amendment are solicited. Claims 1-5 and 7-16 will be pending subsequent to entry of this Amendment.

Discussion of Amendments to the Claims

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention, direct them to preferred aspects of the disclosure and address the claim clarity issue. More specifically, claim 1 has been reformatted, the subject matter of claim 6 incorporated into claim 5 and claim 16 has been amended to respond to the examiner's rejection on page 2 regarding claim clarity.

The balance of the Official Action includes four separate prior art-based rejections all based on the same published Japanese application which is applied via the machine translation of it. Applicants believe that the machine translation of Example 1 may be imprecise so attached to this response are paragraphs [0074]-[0077], Example 1 of the underlying Japanese published application, translated into English by a person familiar with English and Japanese. This response will refer to the attached translated example and not the machine translation.

Response to Rejection of Claims 1-4 and 16

Claims 1-4 and 16 stand rejected as allegedly being anticipated by published Japanese application of Ishikubo JP-2000-204168. The examiner is relying on a machine-translation of the document applied.

Applicants' invention is a method for producing polyorganosiloxane particles as recited in the present claim 1, including a step (A) of obtaining a seed-particles-containing solution and the step (B) of growing the seed particles. Step (A) requires adding 0.7 to 6.5 mass ppm of a basic catalyst to an aqueous medium to cause a silicon compound to undergo preliminary hydrolysis and condensation and then adding a basic catalyst in an amount necessary for forming the seed particles.

In the outstanding Office Action, the Examiner asserts that JP2000-204168A (Ishikubo et al) in paragraphs [0074]-[0077] (Example 1) teaches a method for producing a polyorganosiloxane particles, which comprises hydrolyzing and condensing methyltrimethoxysilane in the presence of a basic catalyst (ammonia) to form seed polyorganosiloxane particles, followed by mixing these seed polyorganosiloxane particles with a

particle-diameter-growing aqueous solution containing methyltrimethoxysilane to grow the seed particles. However, Ishikubo et al do not disclose any information regarding preliminary hydrolysis and condensation of a silicon compound in the step (A) of obtaining seed-particles-containing solution.

In this connection, further, the Examiner points out that Example 1 of Ishikubo et al discloses the formation of seed particles in the presence of 1.8 mass ppm of ammonia. However, the ammonia concentration in the above Example 1 is not 1.8 mass ppm, but is at least an order of magnitude larger, that is 50.5 mass ppm which is calculated as follows:

$2.7 \times 0.28 / (13162 + 1500 + 279.2 + 6.98 + 2.7 + 15)$ (*see* paragraphs [0074]-[0075] of the Ishikubo et al reference). It is hence clear that the above ammonia concentration does not fall within a concentration of 0.7 to 6.5 mass ppm that the present claim 1 specifies as the concentration of the basic catalyst in the step of preliminary hydrolysis and condensation of a silicon compound.

Further, the method described in the above Ishikubo et al reference is a method in which an ammonia-containing solution is formed as a lower layer, a methyltrimethoxysilane-containing solution is formed as an upper layer and a reaction is carried out while maintaining the state of the two layers (*see* the above paragraphs). In contrast, the method specified in the present claim 1 is a method in which a basic catalyst such as ammonia or the like is added to a solution containing a silicon compound and a reaction is carried out in the state of a single layer. Therefore, the present invention and the invention of the Ishikubo et al reference are completely different in their reaction mode.

It is therefore clear that the invention of the present claim 1 is novel over the disclosure of the Ishikubo et al reference (JP2000-204168A).

Further, the invention of the present claim 1 includes an essential requirement that is not described in the Ishikubo et al reference, whereby applicants' process provides polyoroganosiloxane particles which satisfy a particle diameter range (1 to 30 μm) suitable as a spacer for a liquid crystal display or standard particles and which are monodisperse in a particle diameter distribution can be produced at high yields in a short period of time by simple procedures. It is hence clear that the invention of the present claim 1 is inventive over the disclosure of the Ishikubo et al reference.

Further, since the invention of the present claim 1 is novel and non-obvious, it is also clear that the inventions of the present claims 2 to 4 dependent upon the present claim 1 and the invention of the present claim 16 including all the essential requirements of the present claim 1 are also patentable.

Response to Rejection of Claims 5-9

Claims 5-9 are separately rejected as allegedly being unpatentable over the disclosures of the reference discussed above.

The method for producing polyorganosiloxane particles, recited in the present claim 5, includes the step (A) of obtaining a seed-particles-containing solution and the step (B) of growing the seed particles. Step (B) includes measuring the diameter of the seed particles either continuously or at intervals of a constant time period and terminating the reaction when an intended particle diameter is reached.

In the outstanding Office Action, the Examiner argues that the invention of the present claim 5 is easily inferable from the Ishikubo et al reference and known art. Applicants disagree.

As explained above, all the essential requirements of claim 6 are incorporated into claim 5, i.e., the requirements that “the seed particles are measured for diameters continuously or at intervals of a constant time period in a manner in which part of the reaction solution is sampled and brought into contact with a protective-colloid-forming agent to form a protective colloid on the particles in the reaction solution, and then the measurement is made by a Coulter method.”

As the Examiner admits in the outstanding Office Action, the Ishikubo et al reference does not disclose any information pertaining to measuring particle diameters continuously or at intervals of a constant time period, nor does it disclose the concept of forming a protective colloid on the particles in the reaction solution and then making the measurement by a Coulter method, all as specified in claim 6. Having the above essential requirements specified in claim 6 included in claim 5 means that the measurement can be stably made without any shrinkage of the particles in diameter during the measurement (this is explained in applicants’ specification, page 32, lines 14 to 17).

Therefore, it is clear that amended claim 5 is patentable over the disclosure of the Ishikubo et al reference.

Similarly as amended claim 5 is patentable so too are the inventions of present claims 7 to 9 dependent upon the amended claim 5.

Response to Rejection of Claims 10-15

Claims 11-13 are rejected on the same primary reference in view of a secondary reference to Fujino. Claims 11-13 are discussed in the Official Action at the top of page 7 but later, in the same text, claim 14 is discussed so it is counsel's understanding that claim 14 was intended to be included in this rejection. Claims 10 and 15 are separately rejected over the primary reference alone. Applicants traverse both rejections.

The method for producing polyorganosiloxane particles, recited in the present claim 10, includes the step (A) of obtaining a seed-particles-containing solution and the step (B) of growing the seed particles. In the step (B), an anionic surfactant is added to the seed-particle-containing solution to grow the seed particles. The anionic surfactant has a concentration that satisfies the relational expression (II),

$$Y = \alpha \times (a \times X) / (A \times R) \quad (II)$$

wherein:

a: a molecular weight of a product obtained after hydrolysis and condensation of the silicon compound/a molecular weight of the silicon compound (theoretical value),

Y: a concentration (mass %) of the anionic surfactant in the particle-diameter-growing aqueous solution,

X: a mass (g) of the raw material to be used for synthesis of the seed particles,

A: a total mass (g) of the solutions for use in the step (B) of growing seed particles,

R: an average particle diameter (μm) of the seed particles, and

α : a coefficient ($4.0 < \alpha \leq 75$).

In the outstanding Office Action, the Examiner contends that Example 1 of the Ishikubo et al reference uses a surfactant having a concentration Y that satisfies the above relational expression.

However, in the Ishikubo et al reference the relevant part of this example has the heading "Growth of Seed Crystals" and this passage does not disclose the use of a surfactant-containing aqueous solution for growing seed particles in diameter (*see* paragraph [0077] of the Ishikubo et

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al reference), so that it is clear that the invention of claim 10 is non-obvious over the Ishikubo et al reference.

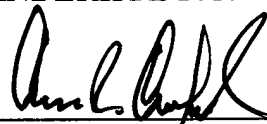
Further, since the invention of the present claim 10 is patentable, present claims 11 to 15 dependent upon present claim 10 are also patentable.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,

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JP2000-204168 (Ishikubo et al reference)

[0074]

[Example 1] Preparation of dispersion of seed particles

A vessel having a volume of 20 L was charged with 13,162 g of pure water, and the pure water was temperature-adjusted to $0\pm 1^{\circ}\text{C}$ with stirring. Further, 1,500 g of methyltrimethoxysilane (methyltrimethoxysilane) that had been temperature-adjusted to 5°C beforehand was stably added, to bring about a state where the methyltrimethoxysilane and pure water were separated into two layers of upper and lower layers, followed by cooling with stirring until the methyltrimethoxysilane forming the upper layer had a temperature of $1\pm 1^{\circ}\text{C}$.

[0075]

Separately, 6.98 g of butyl alcohol and 2.70 g of aqueous ammonia having a concentration of 28 % were added to 279.2 g of pure water, and 15.0 g of an anionic surfactant (sodium octylnaphthalenesulfonate) was added thereto, to prepare a surfactant-containing solution that was temperature-adjusted to $5\pm 1^{\circ}\text{C}$. The thus-obtained surfactant-containing solution was added to the lower layer (aqueous layer) of the two-layer solution over the time period of 60 minutes with stirring to such an extent that the upper and lower layers were not completely mixed.

[0076]

Thereafter, the stirring was continued for 2 hours to prepare a dispersion of hydrophobic seed particles (S-1). Part of the dispersion of hydrophobic seed particles was sampled, and the hydrophobic seed particles were separated, washed and dried at 110°C for 2 hours to give a powder of the hydrophobic seed particles. The thus-obtained hydrophobic seed particles were observed through a scanning electron microscope photograph to evaluate them for a particle diameter distribution and particle diameter variation coefficient CV value of the seed particles.

Table shows the results.

[0077]

Growth of seed particles

While 14,965.5 g of the thus-prepared dispersion of hydrophobic seed particles was maintained at a temperature of $0\pm 1^{\circ}\text{C}$, 6.008 g of methyltrimethoxysilane and a mixture solution of 23,527.7 g of pure water that was temperature-adjusted to $5\pm 3^{\circ}\text{C}$, 588.6 g of butyl alcohol and 4.8 g of aqueous ammonia having a concentration of 28 % were respectively added over the time period of 24 hours, to grow the hydrophobic seed particles, whereby a dispersion (PS-1) of polyorganosiloxane fine particles was prepared.